



Substitute for form 1449APTO

Substitute for form 1449APTO

The bit Department Methods here of 1660, to perform one regarded in reported in control of physics for including a set of CAS (not perform one regarded in reported in reporte

US PATENT DOCUMENTS						
Examiner Initial *	USP Document Number	Publication Date	Name of Palentoe or Applicant of cited Document	Class	Subctans	Filling Dale If Appropriate
if	US-4412902	11/01/1983	Michikami, Osamu , et al	204	192	06/18/1982
1	US-4780424	10/25/1988	Holler, Mark A	437	29	09/28/1987
	US-5350738	09/27/1994	Hase, Takashi , et al	505	473	11/27/1992
	US-5691230	11/25/1997	Forbes, L.	437	62	09/04/1996
1	US-5801401	09/01/1998	Forbes, L.	257	77	01/29/1997
	US-6852306	12/22/1998	Forbes, Leonard	257	315	01/29/1997
	US-5981350	11/09/1999	Geusic, J. E., et al	438	386	05/29/1998
	US-5991225	11/23/1999	Forbes, L., et al	365	230.06	02/27/1998
1	US-6025627	02/15/2000	Forbes, L., et al	257	321	05/29/1998
1	US-6135175	10/24/2000	Gaudreault, P., et al	144	4.1	10/19/1998
1	US-6141238	10/31/2000	Forbes, L., et al	365	145	08/30/1999
4	US-6153468	11/28/2000	Forbes, L., et al	438	257	05/17/1999

FOREIGN PATENT DOCUMENTS					
Examiner Foreign Document No Initials*	Publication Date	Name of Patentae or Applicant of cited Document	Class	Subclass	7

	OTHE	R DOCUMENTS - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials	Cite No 1	include name of the author (in CAPTAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, etcy and/or country where published.	T²
B		ARYA, S., "Conduction Properties of Thin Al2O3 Films", Thin Solid Films, 91, (1982), pp. 363-374	
1		DIPERT, B., "Flash Memory Goes Mainstream", <u>IEEE Spectrum</u> , 30, (October 1993),48-62	
		ELDRIDGE, J.M., "Growth of Thin PhO Layers on Lead Films", Surface Science, 40, (1973),pp. 512-530	
		ELDRIDGE, J., "Measurement of Tunnel Current Density in a Metal-Oxide-Metal System as a Function of Oxide Thickness", Proc. 12th Intern. Conf. on Low Temperature Physics, (1971),pp. 427-428	
		GREINER, J.G., "Josephson Tunneling Barriers by if Sputter Etching in an Oxygen Plasma", Journal of Applied Physics, vol. 42, no. 12, (November 1971),5151-5155	
		GREINER, J., Oxidation of lead films by if sputter etching in an oxygen plasma*, Journal of Apolied Physics, 45(1), (1974).pp. 32-37	
		GRIMBOLT, J.,"I. Interaction of Al Films with O2 at Low Pressures", <u>Journal of</u> the Electrochemical Society, 129(10), (1982),pp. 2366-2368	
		GRIMBOLT, J., "II. Oxidation of Al Films", <u>Journal of Electrochem Soc.: Solid-</u> State Science and Technology, (1982),pp. 2369-2372	
V		GUNDLACH, K., "Logarithmic Conductivity of Al-Al2O3-Al Tunneling Junctions	

EXAMINER DATE CONSIDERED 10/03/2004

Solution Processes Structure PTD-14449

-EXAMONDS: talked Section Structure or real states to in continuous and real consistent. Include copy of the sum with read communication to continuous and real consistent. Include copy of the sum with read communication to continuous and real consistent.





CCPY

Surbstillute for form \$448APTO	Conglete F Known	melayang pa sandanang pa ta capatapan an japa-waggan dapata pa canapala a sangi dingi manjal utahir (Ta benird) palamang panganggan pagan	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application Number	09/945500	
(Use as many aboots as accossory)	Filing Date	August 30, 2001	
	First Named Inventor	Forbes, Leonard	
	Group Art Unit	Unknown	
	Examiner Name	Unknown	
Sheet 2 of 2	Attorney Docket No: 01303.029US1		

	OTHE	R DOCUMENTS - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cita No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, sympostum, catalog, etc.), date, page(s), volume-lesse number(s), publisher, city and/or country where published.	J ₂
H		Produced by Plasma and by Thermal Oxidation", <u>Surface Science</u> , 27. (1971).pp. 125-141	l
1		HODGES, D.A., Analysis and Design of Digital Integrated Circuits, 2nd Edition, McGraw-Hill Publishing, New York, (1988), pp. 354-357	
		HURYCH, Z., Influence of Non-Uniform Thickness of Dielectric Layers on Capacitance and Tunnel Currents", Solid-State Electronics, vol. 9, (1966),967-	
		979 KUBASCHEWSKI, O., Oxidation of Metals and Alloys, Butterworths, London,(1962).pp. 53-63	
		LUAN, H., "High Technology Ta2O5 Gate Dielectrics with Tox,eq<10A", EDM, (1999).op. 141-144	
		MASUOKA, FUIIO., A 256K flash EEPROM using Triple Polysilicon Technology, 1985 IEEE International Solid-State Circuits Conference, Digest of Technical Papers, (1985), 168-169	
		MASUOKA, FUJIO., A new Flash E2PROM Cell using Triple Polysilicon Technology*, International Electron Devices Meeting. Technical Digest, (1984),464-467	
		MORI, S., "Reliable CVD Inter-Poly Dieletrics for Advanced E&EEPROM", 1985 Synposium on VSLI Technology, Digest of Technical Papers, (1985),pp. 18-17 PASHLEY, RICHARD.D., "Flash Memories: the best of two worlds", IEEE	
		Spectrum, (1989),30-33 POLLACK, S., "Tunneling Through Gaseous Oxidized Films of Al2O3".	_
		Transactions of the Metallurgical Society of AIME, 233, (1965),pp. 497-501 SHI, Y., Tunneling Leakage Current in Ultrathin (<4 nm) Nitride/Oxide Stack Dielectrics*, [EEE Electron Device Letters, 19(10), (1998),pp. 388-390	
		SIMMONS, J., "Generalized Formula for the Electric Tunnel Effect between SImiliar Electrodes Separated by a Thin Insulating Film", Journal of Applied Physics, 34(6), (1963),pp. 1793-1803	
1	1	SZE, S., Physics of Semiconductor Devices, Second Edition, John Wiley & Sons, New York, (1981), pp. 553-556	

EXAMINER PLANT MAN DATE CONSIDERED 10/03/2007/
Substitute the first between Statement From (PTC)-544(1)

- EXAMPLER initial to conduct and, whether or not dictate in its conformation with PPCP (St. Drive to the design of an in configuration and are consistent, include copy of this trans with rest consumeration in





CCPY

	United the Promoted States of May 1996 to persons at	Accounted for the Underly 100 (2000). Calls of the contract of the Underly 100 (2000). Calls of the contract of the Underly 100 (2000). Calls of the contract of the United States (2000). Calls of the Contract of the Contra
Substitute for form 1449A/PTO	Complete if Krewn	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application Number	09/945500
(Uso as many phoetic as necessary)	Filing Date	August 30, 2001
	First Named Inventor	Forbes, Leonard
	Group Art Unit	2818
	Examiner Name	Pham, Ly
Sheet 1 of 3	Attorney Docket No: 1	1303.029US1

US PATENT DOCUMENTS						
Examiner Initial *	USP Document Number	Publication Date	Name of Patentice or Applicant of cited Document	Chass	Subclase	Filing Date # Appropriate
P	US- 2001/0013621	08/01/2001	Kazuo, Nekazato	257	314 .	
1	US- 2002/0106536	08/08/2002	Lee, Jongho , et al.	428	702	02/02/2001
	US- 2002/0137250	09/26/2002	Nguyen, B. , et al.	438	53	03/15/2002
	US-4,295,150	10/13/1981	Adam, Fritz	357	54	10/01/1979
	US-4,757,360	07/12/1988	Faraone, Lorenzo , et al.	257	317	07/06/1983
	US-5,042,011	08/20/1991	Casper, Stephen L., et al.	365	205	05/22/1989
	US-5,071,782	12/10/1991	Mori, Kiyoshi	437	48	06/28/1990
	US-5,073,519	12/01/1991	Rodder, Mark	438	269	
	US-5,280,205	06/18/1994	Green, Robert S., et al.	307	530	04/16/1992
	US-5,399,516	03/21/1995	Bergendahl, A, et al.	437	43	09/21/1992
 	US-5.418,389	05/23/1995	Watanabe, Y.	257	295	11/09/1993
	US-5.497.494	03/05/1996	Combs, J, et al.	395	750	07/23/1993
\neg	US-5,498,558	03/12/1996	Кароог, А	437	43	05/06/1994
	US-5,508,544	04/16/1996	Shah, P. L	257	316	09/27/1994
	US-5,600,592	02/04/1997	Atsumi, S., et al.	365	185.18	05/08/1995
	US-5,618,575	04/08/1997	Peter, Gunter	427	8	04/21/1995
	US-5,619,642	04/08/1997	Nielsen, M , et al.	395	182.04	12/23/1994
	US-5,627,785	05/06/1997	Gilliam, Gary R., et al.	365	189.01	03/15/1996
	US-5.677.867	10/14/1997	Hazani, E.	365	185	06/30/1995
	US-5,880,991	03/09/1999	Hsu, L, et al.	365	182	04/14/1997
	US-5,923,056	07/13/1999	Lee, Woo-Hyeong, et al.	257	192	03/12/1998
	US-5,936,274	08/10/1999	Forbes, L., et al.	257	315	07/08/1997
	US-5,986,932	11/16/1999	Ratnakumar, K. N., et et.	365	185.07	06/30/1997
-	US-6,025,228	02/15/2000	lbok, E., et al.	438	261	11/25/1997
_	US-6.031,263	02/29/2000	Forbes, L., et al.	257	315	07/29/1997
	US-6,069,380	05/01/2000	Chou, et al.	257	315	
_	US-6,069,816	05/30/2000	Nishimura, Kiyoshi	365	145	11/24/1998
	US-6,124,729	09/26/2000	Noble, W. P., et al.	326	41	02/27/1998
_	US-6,134,175	10/17/2000	Forbes, L., et al.	365	230.06	08/04/1998
J	US-6,141,24B	10/31/2000	Forbes, Leonard, et	365	185.08	07/29/1999

EYAMINED

DATE CONSIDER

SELECTURE CHIPTERING COMMISSION OF CHIPTERING THE CHIPTERING THE CHIPTERING C





COPY

Substantia from 149APTO	Complete If Amount				
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application Number	09/945500			
(Nice the words the best and b	Filing Date	August 30, 2001			
	First Named Inventor	Forbes, Leonard			
	Group Art Unit	2818			
·	Examiner Name	Pham, Ly			
Sheet 2 of 3	Attorney Docket No: 1303.029US1				

r 18P	US-6,143,636	11/07/2000	Forbes, L., et al.	438	587	08/20/1998
1	US-6,163,049	12/19/2000	Bui, N. D.	257	321	10/13/1998
	US-6,208,164	03/27/2001	Noble, W. P., et al.	326	41	08/04/1998
	US-6,229,175	05/08/2001	Uchida, Hidetsugu	257	315	03/19/1999
\vdash	US-6,238,976	05/29/2001	Noble, W. P., et al.	438	259	02/27/1998
	US-6,246,606	06/12/2001	Forbes, Leonard , et al.	365	185.03	09/02/1999
	US-6,249,020	06/19/2001	Forbes, L., et al.	257	315	08/27/1998
	US-6,249,460	06/19/2001	Forbes, L., et al.	365	185.28	02/28/2000
	US-6,307,775	10/23/2001	Forbes, L., et al.	365	185.01	08/27/1998
-	US-6,351,411	02/26/2002	Forbes, Leonard, et al.	365	182	06/12/2001
	US-6,424,001	07/23/2002	Forbes, L., et al.	257	315	02/09/2001

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Foreign Document No	Publication Date	Name of Patarine or Applicant of cited Document	Class	Eubclass	T [*]

	OTHE	R DOCUMENTS - NON PATENT LITERATURE DOCUMENTS	
Examiner Installa	No "	include name of the surrior (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, sectel, symposium, cotalog, etc.), dote, page(s), votume-issue number(s), publisher, city and/or country where published.	14
4		AFANAS'EV, V, et al., "Electron energy barriers between (100)Si and ultrathin stacks of SiO2, Al2O3, and ZrO3 and ZrO2 insulators", Applied Physics Letters, 78(20), (2001), pp. 3073-3075	
		EIERDAL, L., et al., "Interaction of oxygen with Ni(110) studied by scanning tunneling microscopy", Surface Science, 312, (1994),pp. 31-53	
		ELDRIDGE, J., et al., "Analysis of Ultrathin Oxide Growth on Indium", Thin Solid Films, 12, (1972), pp. 447-451	
		GUO, X., "High Quality Ultra-thin (1.5 nm) TiO2/\$i3N4 Gate Dielectric for Deep Sub-micron CMOS Technology", IEDM Technical Digest, (1999), pp. 137-140	
		HODGES, D. A., et al., <u>Analysis and Design of Digital Integrated Circuits</u> , McGraw-Hill Book Company, 2nd Edition, (1988), pp. 394-396	
		ITOKAWA, H., "Determination of Bandgap and Energy Band Alignment for High- Dielectric-Constant Gate Insulators Using High-Resolution X-ray Photoelectron Spectroscopy", Extended Abstracts of the 1999 International Conference on Solid State Devices and MAterials, (1999), pp. 158-159	
		KIM, H., "Leakage current and electrical breakdown in metal-organic chemical vapor deposited TiO2 dielectrics on silicon substrates", Applied Phys. Lett., 69(25), (1996), pp. 3860-3862	
1		KUBASCHEWSKI, O., et al., Oxidation of Metals and Alloys, Second Edition. Butterworths, London, (1962), pp. 1-3, 5,6, 8-12, 24, 36-39	
- 			

DATE CONSIDERED

Extension with a retespen considered, whether or cut chains a in conference with MPEP ECS. Down like the cut chains a real considered, which one of





CCPY

	Under the Reservoirt Reduction All of 1995, to provide at	PRESSTREAM (1807) Appropriate common terration of common terration			
Substitute for form 1449A/PTO	Consists & Krawn				
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application Number	09/945500			
Use as many sheets on nacessary)	Filing Date	August 30, 2001			
	First Named Inventor	Forbes, Leonard			
	Group Art Unit	2818			
	Examiner Name	Pham, Ly			
Sheet 3 of 3	Attorney Docket No: 1	303.029US1			

	OTHE	R DOCUMENTS - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No 1	Include name of the author (in CAPITAL LETTERS), little of the article (when appropriate), this of the firm (book, magazine, journal, serial, symposium, catalog, etc.), data, page(s), volume-issue number(s), publisher, city and/or country where published.	r
4		KUKLI, K., "Development of Dielectric Properties of Niobium Oxide, Tantalum Oxide, and Aluminum Oxide Based Nanolayered Materials", <u>Journal of the Electrochemical Society</u> , 148(2), (2001), pp. F35-F41	
i	-	KWO, J., "Properties of high k gate dielectrics Gd2O3 and Y2O3 for Si", Journal of Applied Physics, 89(7), (2001),pp. 3920-3927	
		MA, Y., "Zirconium Oxide Based Gate Dielectrics with equivalents Oxide Thickness of LEss Than 1.0 nm and Performance of Submicron MOSFET using a Nitride Gate Replacement Process", IEDM - Technical Digest , (1999), pp. 149-152	
		MARSHALEK, R., et al., "Photoresponse Characteristics of Thin-Film Nickel- Nickel Oxide-Nickel Tunneling Junctions", IEEE Journal of Quantum Electronics, QE-19(4), (1983), pp. 749-754	
		MULLER, H., "Electrical and Optical Properties of Sputtered In2O3 Films", Physica Status Solidi, 27(2), (1968), pp.723-731	
	_	QI, W, "MOSCAP and MOSFET characteristics using ZrO2 gate dielectric deposited directly on Si", IEDM - Technical Digest, (1999),pp. 145-148	
		ROBERTSON, J., "Band offsets of wide-band-gap oxides and implications for future electronic devices", <u>Journal Vao. Sci. Technol. B.</u> 18(3), (2000), pp. 1785-1791	
		ROBERTSON, J., et al., "Schottky Barrier height of Tantalum oxide, barium strontlum titanate, lead titanate, and strontlum bismuth tantalate", <u>Applied</u> Physics Letters, vol. 74, no. 8, (02/22/1999), pp. 1168-1170	
		SWALIN, R., "Equilibrium between Phases of Variable Composition", Thermodynamics of Solids, 2nd Edition, (1972), pp. 165-180	
		YAN, J., et al., "Structural and electrical characterization of TiO2 grown from titanium tetrakis-isopropoxide (TTIP) and TTIP/H2O ambients", <u>Journal Vac. Sci.</u> Technol. B, 14(3), (1996), pp. 1706-1711	

EXAMINER DATE CONSIDERED 18/03/2000

Substitute Darling Discounts From PTO-1440)





COPY

Substitute for form 1449AIPTO	Comparte / Known				
INFORMATION DISCLOSURE	Applicati n Number	09/945500			
STATEMENT BY APPLICANT	Filing Date	August 30, 2001			
Sheet 1 of 2	First Named Inventor	Forbes, Leonard			
	Group Art Unit	2818			
	Examiner Name Pham, Ly				
	Attorney Docket No: 1303.029US1				

		US PA	ATENT DOCUMENT	<u>S</u>		
Examiner Initial	USP Document Number	Publication Data	Name of Palentee or Applicant of cited Document	Class	Şu hcl ass	filing Date if Appropriate
H	US- 2003/0042527	03/06/2003	Forbes, Leonard, et al.	257	315	08/30/2001
	US- 2003/0042532	03/06/2003	Forbes, Leonard	257	316	08/30/2001
	US- 2003/0043622	03/06/2003	Forbes, Leondard	365	185.05	08/30/2001
	US- 2003/0043630	03/06/2003	Forbes, Leonard, et al.	365	185.26	08/30/2001
	US- 2003/0043632	03/06/2003	Forbes, Leonard	365	185.28	08/30/2001
	US- 2003/0043633	03/06/2003	Forbes, Leonard , et al.	365	185.28	12/20/2001
\dashv	US- 2003/0043637	03/06/2003	Forbes, Leonard, et al.	365	185.33	08/30/2001
	US- 2003/0045082	03/06/2003	Eldridge, Jerome M., et al.	438	593	02/20/2002
-	US- 2003/0048666	03/13/2003	Eldridge, Jerome M., et al.	365	185.28	06/21/2002
+	US- 2004/0004245	01/08/2004	Forbes, Leonard , et al.	257	315	07/08/2002
1	US- 2004/0004247	01/08/2004	Forbes, Leonard, et al.	257	324	07/08/2002
	US- 2004/0004859	01/08/2004	Forbes, Leonard, et al.	365	185.05	07/08/2002
	US-3,978,577	09/07/1976	Bhattacharyya, Arup , et al.	29	571	06/30/1975
	US-4,449,205	05/15/1984	Hoffman, Charles R.	365	182	02/19/1982
	US-4,495,219	01/22/1985	Kato, Takashi , et al.	427	82	10/08/1982
-	US-4,717,943	01/05/1988	Wolf, Hans P., et al.	357	23.5	07/16/1986
	US-4,794,565	12/27/1988	Wu, Albert T., et al.	365	185	09/15/1986
_	US-4,870,470	09/26/1989	Bass Jr., Roy S., et al.	357	23.5	10/16/1987
	US-5,445,984	08/29/1995	Gary, Hong, et al.	437	43	11/28/1994
_+	US-5,445,984 US-5,455,792	10/03/1995	Yi. Yong-Wan	365	185.12	09/09/1994
	US-5,510,278	04/23/1996	Bich-Yen, Nguyen , et al.	437	40	09/06/1994
	US-5,617,351	04/01/1997	Bertin, Claude L., et al.	365	185.05	06/05/1995
 	US-5,646,430	07/08/1997	Kaya, Cetin, et al.	257	322	08/28/1995
 	US-5,952,692	09/14/1999	Nakazato, Kazuo, et	257	321	10/28/1997

EXAMINER

DATE CONSIDEREI

era Form (PTQ-1440) suph station if not in confirmation and not considered. Induce supy of this suph station if not in confirmation and not considered. Induce supy of this INFORMATION DISCLOSURE

STATEMENT BY APPLICANT

Substitute for form 1449A/PTO





COPY

Compacts & Fromm
Application Number
O9/945500
Filing Date
August 30, 2001
First Named Inventor
Forbes, Leonard
Group Art Unit
2818
Examiner Name
Pham., Ly

Attorney Docket No: 1303.029US1

2BL 2 O	12					
\mathcal{H}	US-6,101,131	08/08/2000	Chang, Ming-Bing	365	185.33	04/22/1999
	US-6,127,227	10/03/2000	Lin, Chrong J., et al.	438	261	01/25/1999
+-	US-6,169,306	01/02/2001	Gardner, Mark I., et	257	310	07/27/1998
-	US-6,288,419	09/11/2001	Prall, Kirk D., et al.	257	213	07/09/1999
	US-6,461,931	10/08/2002	Eldridge, Jerome M.	438	398	08/29/2000
	US-6,475,857	11/05/2002	Kim, Woosik, et al.	438	240	06/21/2001
1	US-6,586,797	07/01/2003	Forbes, Leonard, et al.	257	325	08/30/2001

	FOREIGN PATENT	DOCUMENTS			
Examiner Foreign Document No	Publication Date	Name of Palentee or Applicant of gilled Document	Chase	Subclass	T ² .

	OTHE	R DOCUMENTS - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No	bridge name of the author (in CAPITAL LETTERS), tile of the article (when appropriets), due to the interest of the author (in CAPITAL LETTERS), tile of the article (when appropriets), due to the interest of the article (when appropriets), due to the interest of the article (when appropriets), due to the article (when appropriets	T"
18		BHATTACHARYYA, A., "Physical & Electrical Characteristics of LPCVD Silicon Rich Nitride", ECS Technical Digest, J. Eletrochem, Soc., 131(11), 691 RDP,	
1	,	New Orleans, (1984), 469C HAN, KWANGSEOK. "Characteristics of P-Channel Si Nano-Crystal Memory", IEDM Technical Digest, International Electron Devices Meeting, (December 10- 13, 2000), 309-312	
		INUMIYA, S, et al., "Conformable formation of high quality ultra-thin amorphous Ta2 O5 gate dielectrics utilizing water assisted deposition (WAD) for sub 50 nm damascene metal gate MOSFETs", IEDM Technical Digest, International Electron Devices Meeting, (December 10-13, 2000),649-652	
		MANCHANDA, L., "Si-doped aluminates for high temperature metal-gate CMOS: Zr-Al-SI-O, a novel gate dielectric for low power applications", IEDM Technical Digest. International Electron Devices Meeting, (December 10-13, 2000) 23-26	
		SHI, Y., "Tunneling Leakage Current in Ultrathin (<4 nm) Nitride/Oxide Stack Distorting, IEEE Electron Device Letters, 19(10), (1998),pp. 388-390	
		YAMAGUCHI, TAKESHI, "Band Diagram and Camer Conduction Mechanism in ZrO2/Zr-silicate/Si MIS Structure Fabricated by Pulsed-laser-ablation Deposition", Electron Devices Meeting, 2000. IEDM Technical Digest.	
	-	International, (2000),19-22 ZHANG, H., et al., "Atomic Layer Deposition of High Dielectric Constant Nanolaminates", Journal of The Electrochemical Society, 148(4),(2001),F63-F66	

EXAMINER DATE CONSIDERED 10/03/2004

Succession Discourse Equipment Form (PTO-144h)

- EXAMINER Visited it downstoned, whether are not discours to it on principal and the pri